Alternative and Renewable fuels and Vehicle Technology Program
Subject Area: Biofuels production Facilities

Solicitation Number Listed on the Solicitation Notice:

PON-11-601

Applicant for Stage 3: Commercial Facilities

- Applicant's Legal Name: **Yokayo Biofuels, Inc.**

- Name of project: **A Catalyst for Success**

- Project Description:

Yokayo Biofuels, an industry veteran with over 10 years experience, produces and distributes biodiesel. The main goals of this project are to build a safer, expanded biodiesel production plant, with a lower carbon footprint, while creating jobs, improving air quality, and improving the local economy. Infrastructure improvements include new structures, piping, offices, and bioswales for stormwater runoff. These upgrades are complimentary to process improvements that validate production expansion by improving the business model. Through a partnership with Piedmont Biofuels, and the addition of an enzymatic biodiesel production process which incorporates Piedmont's FAeSTER skid unit, Yokayo Biofuels will be able to model a safer, greener, and more economically sustainable way of doing business that can withstand the ebb and flow of government incentives and market conditions. There will be a sizable increase in energy efficiency, 100% elimination of process water input, higher biodiesel yield, elimination of a hazardous material from the process, and generation of a sellable co-product. More biodiesel will be generated for the California marketplace, and the feedstock from which it is produced will all be low carbon. By doing all of this, Yokayo Biofuels will realize the CEC's goal of reducing GHG emissions and petroleum fuel demand, while enhancing the local economy and inspiring the public about what is possible!

- Grant Funding Requested: **$1,860,330**

- Identify the address of the site where the project will take place:
  350 Orr Springs Road, Ukiah, CA 95482

- Primary feedstock used and quantities processed:
  Yellow or brown grease in the form of Restaurant Fryer Oil & Trap Grease

- Primary fuel produced: **Diesel Substitute**

- Technology development stage of project: **Stage 3, Commercial Facilities**

- Quantity of primary fuel to be produced annually: **722,700 gal**

- **No secondary fuels produced**

- Value added co-products: **>97% pure Glycerin**

- **No electricity co-generation will occur**
- **No CEQA will be required for this project**
- **Based on existing Notice of Exemption, this project qualifies for Round 1**
- The Biofuel produced **will have a carbon intensity value lower** than the LCFS pathway for soy biodiesel (83.3 gCO_2-eq/MJ) or for California-produced ethanol using Midwest corn feedstocks (80.7gCO_2-eq/MJ).
- Amount of Match funding: **$2,909,775**
- Source of Match Funding (cash and /or in-kind): **SBA loan and in-kind**
- Proposed Agreement Duration: **June 2012-September 2013**
- Principal Investigator/Project Manager
  Name: **Kumar Plocher**
  Organization's Legal Name: **Yokayo Biofuels, Inc**.
  Address: **350 Orr Springs Rd.**
  Ukiah, CA 95482

Principal Investigator/Project Manger Certification: To the best of my knowledge, I certify that the information contained in this grant application package is true, and discloses all requested information. This package does not contain any confidential information (This signature is only necessary if the Principle investigator/Project Manager is not the Authorized Representative).

Principal Investigator/Project Manager Signature:

_____ Date: _____

Authorized Representative Certification: To the best of my knowledge, I certify that the information contained is this grant application package is true, and discloses all requested information. I have read and agree to be bound by the ARFVT Program Grant Terms and conditions for any agreement resulting from this solicitation. This package does not contain any confidential information.

Authorized Representative Signature:

_____ Date: _____

Executive Summary

Project Description

Yokayo Biofuels was formed in October of 2001 with a purpose to provide an ecological, sustainable, local alternative to fossil fuels. The idea that biofuels are "carbon neutral" is central to our business philosophy. We are completely dedicated to the idea of a local, living economy and support the philosophy in action by the fact that we have never sold, or sourced, our fuel or feedstock outside of Northern California. We do not believe in the inherent sustainability of biodiesel feedstocks such as low-yield crops that double as food (i.e. soybeans), or high-yield crops that compete with rainforest (i.e. palm oil), and have consistently spoken out against such practices, utilizing various platforms including CEO Kumar Plocher's tenure on the National Biodiesel Board's Taskforce on Sustainability, participation at conferences such as the Sustainable Biodiesel Summit, and a wide variety of mixed media articles and interviews.

We began design work for a complete biodiesel facility in 2004 to accommodate our growing demand. Once we had secured our existing site in 2008, we accelerated the engineering project to upgrade and expand our facilities. The project includes constructing new production and lab facilities, upgrading existing buildings to create needed office space and a shared central space which will serve as a meeting room, classroom, kitchen, and locker room, installing new materials storage facilities, resurfacing hardtop and adding bioswales to address stormwater issues, rainwater capture for use in incidental water needs, and landscaping. All existing and new components will be updated for ADA-compliant accessibility, fire prevention systems, and appropriate insulation and HVAC.

There is a second component of this project, concerning the upgrade and expansion of our biodiesel production process. While Yokayo's carbon footprint is already among the best in the industry[1], there is serious room for improvement in energy and water usage, wastewater output, worker safety, product yield, and by-product value. To expand our capacity without addressing these concerns would be impractical, yet expanded capacity is needed to hit a critical economy of scale with which we can sustain ourselves into the future[2]. A new biodiesel reaction process addresses all of these concerns. We are pleased to be partnering with Piedmont Biofuels, a major innovator in enzymatic process technology. We believe strongly in Piedmont's cutting edge process, which we have tested and verified in our own lab. The biodiesel reaction process will be dramatically changed from the current method of using a caustic catalyst (potassium hydroxide flakes) to an enzymatic catalyst. This eliminates a hazardous material from the process, allows for introduction of a lower cost brown grease feedstock (opening the door for expanding B20 sales), creates no soap, and the glycerin co-product is pure. The lack of soap production dramatically increases yield, and greatly reduces wastewater output. It also results in a higher quality final biodiesel product that burns cleaner, is better for engines, and more stable for customers to store.

While much of the initial engineering for this project had already taken place at the time the grant was announced, and been funded by Yokayo Biofuels, this project and its timeline are ambitious. It is our understanding that the California Energy Commission supports such ambition, and supports the quickest timeline possible to expanded production of sustainable biofuels in this State. We are excited that our project satisfies every one of the five "potentially funded activities" under Stage 3: Commercial Facilities, on page 4 of the Grant Solicitation.

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[1] As measured by LCFS registered biorefineries carbon intensity, where Yokayo Biofuels' 11.76gCO2/MJ ranks among the very lowest: http://www.arb.ca.gov/fuels/lcfs/reportingtool/Biofuel_Registration_Info_complete_01042012.pdf

[2] As estimated by our CFO, to be able to break even without any biodiesel incentives.

Project Goals

The project addresses the following goals:

- Expansion of capacity from 1400-2000 gal/day
- Energy reduction
- Dramatically reduced or eliminated water usage
- Sellable co-product (glycerin)
- A safer, cleaner, more comfortable facility
- Elimination of storm water runoff concerns
- Higher quality biodiesel product
- Dramatically higher fuel yield

Projected Costs and Yields

There are seven tasks that comprise this project. The costs breakdown as follows[3]:

1. Agreement Management	$ 101,926
2. Detailed Design and Specifications	$ 21,960
3. Construction Management	$ 216,295
4. Construction of New Facilities	$ 3,866,030
5. Installation of Vessels and Equipment	$ 112,128
6. Start-up Process	$ 26,496
7. Data Collection and Analysis	$ 425,270
Total	**$ 4,770,105**

These tasks will be referenced and explained in greater detail throughout this proposal. The projected costs and benefits associated with the enzymatic process are as follows[4]:

- Enzyme cost of $ .173/gal biodiesel
- Wash process savings of $ .037/gal biodiesel
- Methanol usage savings of $ .06/gal biodiesel
- Glycerin disposal savings of $ .02/gal biodiesel

The biggest single benefit is that projected yield of biodiesel per gallon of feedstock for the enzymatic process is .99 gallons, up 13.8% from our current average yield of .87.[5]

Additionally, the enzymatic method will give us the ability to use brown grease as feedstock, which is a lower carbon feedstock, in line with the goals of this grant, and is available for approximately half the cost of yellow grease on the open market, enabling our expansion.

Expansion of sales into B20 blends, for which brown grease is an appropriate feedstock, will provide the proper outlet for the new fuel. Thus, the enzymatic process allows us to grow production ahead of in-house grease collection. That is a huge additional "yield" of the project.

Other Quantitative and Measurable Objectives to be Achieved

- 62.5% less heat used in biodiesel process
- Creation of 8 permanent jobs
- 100% elimination of soap in biodiesel
- 33% reduction in our carbon intensity

[3] See budget Attachment F

[4] See attached multiple process production costs comparison spreadsheet

[5] Current average yield is based on finished fuel divided by feedstock that goes into the reactor. Enzymatic yield is based on Yokayo Biofuels lab testing, documented in attached multiple process production costs comparison spreadsheet

Project Narrative

The proposed project begins with construction of two new buildings. The first will be a 4,500 sq. ft. steel-framed metal-roofed structure with three open sides. This building will house the washing process and processing of by-products. An enclosed laboratory will be constructed in the southeast corner of the roofed-structure. The second new building will be a 1,600 sq. ft. fire-rated concrete building located adjacent to the roofed structure. This enclosed facility will house the mixing and enzymatic reaction process[6].

Switching to the enzymatic process requires, in addition to enzymes (for which there is an established supply chain), a skid-mounted FAeSTER processing unit from Piedmont Biofuels. With the exception of the new technology, the process is completely compatible with our existing equipment. The skid-mounted FAeSTER unit, a proprietary method that allows the reaction to reach the full ASTM standard, is necessary as an important specification we have not been able to reach in the absence of such technology.

To obtain the FAeSTER unit, we will complete the attached Equipment Purchase Agreement from Piedmont Biofuels[7], and follow the terms set forth in that agreement. Prior to receiving the equipment, Yokayo Biofuels will send its CEO, both engineers, and the production plant supervisor to Piedmont Biofuels for hands on instruction on the use of the equipment. After the reception and installation of equipment at Yokayo Biofuels, Piedmont Biofuels will perform prescribed tests to determine that the equipment is operating in conformity with its specifications.

With the hazardous components of the process moved out into the new buildings in the facility yard, the westernmost portion of the existing production building will be used for raw material processing, washed biodiesel dehydration (back up processing procedure in the event of equipment failure), and finished biodiesel storage. It will be upgraded with fire suppression sprinkler equipment.

New offices and staff facilities will be constructed on the east half of the existing building, including central heating, venting, and air conditioning systems, as well as an appropriate office-scale fire prevention sprinkler system. There will be seven private offices and one large meeting room. The meeting room will serve as a classroom, kitchen, and locker room. The entrance to the offices and the bathroom will be upgraded to meet Americans with Disabilities Act requirements (with match funds).

A methanol vault storage tank will be installed in the open area between the new building and the existing building, and will be surrounded by crash-rated vehicle bollards. A liquid nitrogen blanketing system will be installed to increase fire safety.

There will be two pipelines in covered concrete trenches to connect the vessels in the existing building with the vessels in the new buildings. One pipeline will transport processed used fryer oil to the mixing vessel in the new building. The second pipeline will transport washed fuel back to the dehydrator in the existing building. A third pipeline in a covered trench will transport methanol to the mixing vessel in the new building from the methanol storage tank.

Yokayo Biofuels will own and operate the proposed project.

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6 See attached Building Plans

7 See attached Equipment Purchase Agreement

The goal of the proposed project includes construction of a biodiesel production facility with a capacity of 2,000 GPD and utilization of the FAeSTER enzymatic process for producing methyl esters (biodiesel) from used fryer oil and brown trap grease. The project will also increase capacity for production, and will incorporate Building Code and Fire Code safety requirements.

The proposed project is not required to be undertaken in order to reduce the emission of one or more criteria pollutants, toxic air contaminants, or any greenhouse gas.

Qualifications of the Applicant/Project Team:

Yokayo Biofuels Key Personnel:
Kumar Plocher [8]: Founder, CEO, Company Visionary with over 10 years leadership experience in the biodiesel industry including completion of Iowa State University's Commercial Biodiesel Production Technology workshop, former member of CEC working group on biodiesel, former member NBB Sustainability Taskforce, current member of CBA Board of Directors
Function: Project Manager, CEO
Specific Contributing Experience: Founder of company, established its original accounting system, developed sales department, developed oil collection operation, developed production process, managed the relocation of the entire plant, managing current engineering project.
Skills Pertinent to Project Tasks: Fiscal responsibility, visioning, production plant process, quality control, project management, technical analysis, contract writing, managerial supervision, hands on experience with every aspect of this business.

Steve Plocher[8]: CFO, CPA with over 30 years of accounting and leadership experience
Function: Project Controller, CFO
Specific Contributing Experience: Yokayo's CFO since 2004; has owned and managed Stephen Plocher Accountancy Corporation for 22 years, co-owned Lombardi & Plocher CPAs for 7 years, specializes in audits, financial consulting, management of complex budgets, fiscal compliance, growth, development, and equipment procurement including financing.
Skills Pertinent to Project Tasks: Accounting, financial oversight, government contract compliance experience

Nancy Ann Atkinson, **PE**[8]: Civil Engineer with 14 years experience in public and private engineering sectors, including project management of multiple facility planning, design, and construction projects.
Function: Engineering and Construction Manager
Specific Contributing Experience: Project Manager for $1.5M sewer force main replacement adjacent to a sensitive waterway, including preparation and coordination of State funding application and reports, CalTrans right of way, Coastal Commission Development, State Lands Commission right of way and State Water Board CEQA permitting, consultant selection and management, construction oversight and coordination with Federal and State resource agencies during construction.
Skills Pertinent to Project Tasks: Civil Engineering, project management, excellent communication.

[8] **SEE ATTACHED RESUMES**

Brian Eberly[9]: Mechanical Engineer with 7 years experience in alternative energy, process development, biofuels and sustainability planning
Function: Process Manager
Specific Contributing Experience: Designed and built a farm-sized biodiesel plant and ethanol plant as owner of Eberly Alternative Energy. Performed computer modeling and experimental work on wood industry waste to energy project while a Graduate Research Assistant at WVU, including feedstock characterization and laboratory work.
Skills Pertinent to Project Tasks: Project management, lab work, data analysis, technical ability, visioning

Bert Mosier[9]**:** Oil Collection Manager with over 30 years executive leadership experience, including both the fuel and restaurant industries.
Function: Feedstock Manager
Specific Contributing Experience: As Executive Director of Ukiah Chamber of Commerce, CA, Lyndon, KS, and Hoxie, KS Chambers of Commerce, managed member services, implemented business recruitment, retention and expansion; as Owner of Mosier Pumping, Inc., gained experience with commercial trucking, pumping, heavy equipment, and fuel concerns; as Manager of 4-King, operated a restaurant, including its supply/waste chain and its used fryer oil collection protocol.
Skills Pertinent to Project Tasks: Customer relations, technical ability, department management

Jenifer Elmer[9]**:** Sales and Marketing Manager with 8 years experience in sales, marketing, account management and PR.
Function: Biodiesel Product Manager
Specific Contributing Experience: Marketing experience throughout professional career; while at Powerhouse Marketing, established Sales and Marketing Department, developed and maintained customer relationships and developed community partnerships; At Venbea, identified potential new markets for products and developed pricing strategies; at Frank Groff, developed and wrote press releases.
Skills Pertinent to Project Tasks: Customer Service, marketing genius, excellent communication

Key Subcontractors:

Eichleay Engineers, Inc: of California, with offices in Concord, is among the largest privately held providers of specialty technical services in California. Excels at providing the resources necessary to engineer and design specialized, technically complex process facilities.
Function: Primary engineering firm involved in the engineering and construction component of the project, covering a wide variety of components (architecture, civil, chemical, etc.).
Specific Contributing Experience: Yokayo Biofuels began its relationship with Eichleay Engineers, Inc. in 2004, and has continuously worked with this firm in recognition of it being

[9] **SEE ATTACHED RESUMES**

unique in its mastery of the engineering issues that we deal with, with special sensitivity to the more hazardous elements of biodiesel plant operations.
Skills Pertinent to Project Tasks: Specializes in detailed design and specifications for industrial projects like this.

Rau and Associates, Inc: A General Civil Engineering firm in Ukiah providing surveying, environmental, civil and structural design and geotechnical consulting services to Northern California for over 30 years.
Function: The secondary engineering firm involved in the engineering and construction component of the project, handling various aspects of the civil engineering work.
Specific Contributing Experience: Local expertise and history in this area, including their extensive work with the construction firm that originally built this facility, gives them a valuable perspective on the project.
Skills Pertinent to Project Tasks: Specializes in the type of engineering that encompasses the grounds work in this project.
Piedmont Biofuels: A Certified B Corporation based in Pittsboro, North Carolina, that has pioneered biodiesel education and technologies for the better part of the last decade.
Function: Vendor of the Enzymatic Biodiesel Process component of this project.
Specific Contributing Experience: Piedmont and Yokayo have a history of working together, but the most relevant piece of past experience to this project is the work that Piedmont has done in recent years, in cooperation with Novozymes and the Department of Energy, to develop and commercialize Enzymatic Biodiesel.
Skills Pertinent to Project Tasks: Technical and research mastery, visioning, project management
Key Partner:

Lela Wadsworth: A Yokayo Biofuels shareholder and a member of the company's Board of Directors. She is the owner of the property on which Yokayo's production plant facility sits.
Function: Project Site Land Owner
Specific Contributing Experience: Purchased property as an investment in Yokayo's future back in 2008; has steadfastly supported the developments of the company however she can; designed and implemented a pilot project to test biodiesel in school busses- currently expanding that effort with a project to construct a biodiesel station within her children's school district; previously worked for a company that recycled landfill gas, and is continuing in her passion to recycle waste.
Skills Pertinent to Project Tasks: Being a good land owner and visionary.

Technical Development

Biodiesel has a positive history and a promising future as a viable alterative fuel. The product we intend to provide with this project is biodiesel that meets the ASTM D6751 standard. We also intend to go from producing a costly by-product in our current process, crude glycerin, to producing a valuable co-product with the new process, glycerin with greater than 97% purity.

The current process for producing biodiesel has many drawbacks. The process for converting vegetable oils and animal fats to biodiesel involves heating the oil, adding two dangerous chemicals and producing several byproducts.

One of these by-products is soap, which must be removed from the biodiesel before it can be used; this purification process results in either a large volume of wastewater or large amount of solid waste. Another drawback to soap production is that it competes with biodiesel production causing a loss of yield. There is a preprocessing practice that can mitigate some of this loss, but it requires an addition of a dangerous acid and only increases yield a few percent. There is also a post processing practice that can recover yield lost to soaps, but it also requires adding acid and can only recover a few percent. One important technique in reducing soap production is to ensure minimum water content for the feedstock. Drying oil to these levels can consume a great deal of energy.

The other byproduct is crude glycerin, which is so laden with contaminants as to be worthless unless further refined. Many biodiesel producers have incorporated some glycerin refining capabilities into their plants, but this increases costs and complexity, as well as adding more hazardous chemicals.

The cutting edge for biodiesel technology incorporates the use of enzymes to catalyze the reaction. After examining the preceding 15 years of research on the subject, Piedmont Biofuels; with help and involvement from Novozymes, the USDA and the DOE, developed their own enzymatic biodiesel process. They commissioned the first enzymatic biodiesel production plant in the United States in July of 2010. Their plant successfully produced biodiesel fuel that meets the ASTM D-6751 specification. Now they have proven the technology at the commercial scale (2000 gallon batch size). The skid unit they have designed, called the FAeSTER process, is a key component of this project.

Enzymatic biodiesel technology has many benefits. Because it can handle any percentage of FFAs, it accommodates both low and high quality feedstocks equally. Because the process requires a relatively low amount of methanol, and involves some methanol recovery in the FAeSTER skid unit, it is Piedmont's conclusion that "biodiesel plants which do not have acid esterification, or who do not have methanol recovery, have the most to gain from this technology."[10] It eliminates all the need for hazardous potassium hydroxide, creates no soap, and the glycerin byproduct is pure. The lack of soap production eliminates yields loss and the need to purify the biodiesel and eliminates waste water. Other benefits of the enzyme process are a significant decrease in energy needed by the process; being more tolerant to water content, eliminating the need to dry the oil prior to the conversion process, and requiring much lower reaction temperatures. While the enzymes used in the process are more expensive than traditional catalysts, some of them can be reused several times and other can be reused hundreds of times. Also, the additional yields and more valuable glycerin more than offset the added cost.

Test	Unit	Method	Enzymatic Glycerol	Chemical Glycerol
Glycerol Content	% mass	AOCS Ea 6-94	97.55	55.78
Moisture	ppm	ASTM D6304	20500	22900
Ash	%	IUPAC 3.A.4	0	12.87
Methanol	%	EN 14110	0.14	0.45
MONG	%	IUPAC 3.A.6	0.4	29.17

[11]fig.4

[12]fig.5

[10] Enzymatic Catalysis for Biodiesel Production; Piedmont Biofuels

[11] Figure 4 Enzymatic Glycerol Certificate of Analysis

[12] Figure 5 Glycerol Comparison

The enzyme process that Yokayo Biofuels is planning to use is a two stage process. The first stage is partial transesterification. Oil, alcohol, water and enzyme are added to a reactor and heated to 100°F. The reactor is mixed for several hours. In this process the alcohol is not added all at once, but gradually at a low rate. When the reaction is complete and the mixture is allowed to settle, two phases with form. One phase contains FAME, FFAs, and a small amount of methanol, the other contains glycerin, water, methanol and enzyme. The glycerin layer is saved and used to process the next batch of oil (allowing reuse of the expensive enzyme) and the FAME layer goes on to the second stage of processing. In the second stage, the FAME and FFA are mixed with more methanol and a different catalyst that esterifies the FFA into FAME.

Through a proprietary method that is incorporated in the FAeSTER unit, the water that results from the esterification reaction is removed. This process reduces the FFA content of the FAME to within the ASTM specifications for biodiesel. When the reaction is complete, the FAME is purified by removing the methanol and water content via evaporation. The catalyst in the second stage is immobilized on ceramic beads, as opposed to in a solution. These beads can be reused many times, though activity will eventually decrease on the timescale of years. The glycerin layer from the first stage can theoretically be reused many times, though in practice, every time it is used, the glycerin content is increased. Eventually the volume of this layer would surpass the volume of the oil in the batch; in practice 3-7 reuses can be achieved. These particular enzymes only work in a narrow temperature range, 95-110°F, which makes temperature controls important, but reduces much of the heat energy requirements of traditional methods.

The end result of this process is pure biodiesel and pure glycerin, with no wastewater. Traditionally biodiesel is made from virgin oil or yellow grease. Yellow grease is used cooking oil or oil obtained from animal processing. These two forms of oil are expensive but contain the limited amount of FFAs that the traditional method requires. One exciting prospect of enzymatic biodiesel is the tolerance of the process to FFA content. Technically speaking, enzymatic biodiesel can be made from oil that is 100% FFAs. Brown grease is the industry name of grease removed from grease interceptors and grease traps that protect the sewer system from restaurant grease. Brown grease is currently very inexpensive owing to the fact that grease interceptor owners have to pay to have them cleaned. It also cannot be used in traditional biodiesel production unless it is blended in very small amounts owing to a high FFA content. However, the enzyme process can make biodiesel from brown grease readily, thereby greatly reducing the cost of feedstock.

From “Enzymatic Catalysis for Biodiesel Production”, by Piedmont Biofuels:

> *The key take-way for the biodiesel industry is that future biodiesel production will come from high FFA feedstocks. In the current implementation of the second version of the Renewable Fuel Standard (RFS-2), land use concerns were raised in the eligibility of feedstocks for the advanced biofuel category. If land use issues become integrated into environmental policies of nations across the globe, the use of food grade material for biofuels may decrease. Alternatives to food grade materials like the waste greases tend to be very high in free fatty acids.*

Yokayo Biofuels looks forward to helping realize this goal of utilizing more appropriate, "future" feedstocks, today. In this way, we can move the industry forward while making our own operation more sustainable in every sense of the word.

Because the technology is already developed, we see it as our job to demonstrate its viability through its usage in our production plant, thereby aiding in the commercialization process. Our success with the technology should influence sales of future units by Piedmont Biofuels, thus allowing for the deployment of this technology through the industry.

Piedmont Biofuels has estimated that it will take less than three months from the time of order to the time of equipment reception. Considering that Yokayo Biofuels proposes that this technology purchase be grant-funded, and that the timeline for executing an agreement with the California Energy Commission is June 2012, Yokayo Biofuels expects to begin using the technology to produce biodiesel October of 2012.

At that time, the machine will be operating at roughly two-thirds capacity, producing fuel only from the feedstock we are already collecting. There will be a gradual ramping up of additionally purchased brown grease feedstock, timed to coincide with increased B20 blend sales, beginning in November 2012 and culminating with the new process fulfilling its 2000 gallon per day, 60,000 gallons per month production capacity in Spring of 2013. Following is a projected timeline:

October 2012	0 brown grease gallons added
November 2012	5,000 gal
December 2012	10,000 gal
January 2013	15,000 gal
February 2013	20,000 gal
March-September 2013	25,000 gal per month, plant is at capacity
Total	225,000 gal during project

This ramp-up may be accelerated or decelerated based on B20 sales progress. In addition to the new gallons added with brown grease feedstock, there will be the "new" gallons added from the increased yield with the old feedstock. By the time we hit capacity, we will be producing 1,980 gallons of finished biodiesel per day, with a production capacity of 702,900 gallons per year.

Market Development

In addition to wholesale vs. retail, there are two categories of biodiesel markets in Northern California: B99[13] users, and B20 users. In order to sell the additional fuel that will be created through this project's implementation, Yokayo Biofuels is planning on expanding our distribution beyond the B99 market and into the B20 market.

Currently we sell nearly all of our 417,000 annual gallons of fuel in the B99 market. It is a small market, comprising less than 1% of the total diesel demand in our region by our estimate. It is comprised of a loyal group of environmentalists who will pay more for fuel based on their ideals. We created this niche market from scratch, through hard work, benefiting extensively from grassroots marketing and word-of-mouth. After we learned everything about the use of

[13] B99 blend comprises of 99% biodiesel + 1% petroleum, B20 blend comprises of a 20% mix petroleum with biodiesel

biodiesel in various vehicles and equipment, we were the first company in Northern California that introduced the fuel, educated our customer base about its use, supported them when there were questions or problems, and finally offered biodiesel at the retail level to the general public. There are now other companies in Northern California providing biodiesel, although we still have the majority of pure biodiesel sales north of the Bay Area, up to the Northern end of Mendocino County. While we expect to stay strong in this market due to our reputation and experience, there does not appear to be much growth in the B99 sector. It requires a lot of consumer education, and the higher price isn't as generously accepted in poor economic times.

The B20 market is much larger. It is much closer in proximity to the base "diesel market". To get a sense of scale of the diesel market, consider that in Mendocino County alone annual diesel usage is over 8 million gallons[14]. Many fleets that would never consider using B99 are more open to B20 due to the relative ease of entry and lower price. It is also much more competitive than the B99 market, as there are already a number of petroleum jobbers selling B20.

Yokayo Biofuels has been successfully introduced to the B20 market, having just secured our first big customer in the Skunk Train[15]. There is much evidence throughout the biodiesel industry that this market is where most of the sales are, and most of the growth lies. Access to municipal fleets, school busses, solid waste trucks, construction companies, and many other types of customers goes hand in hand with selling B20. B20 does not sacrifice environmental gains (a gallon burned, even as a lesser fraction of the fuel, still nets the same emission benefits), and does not come with the steep learning curve associated with pure fuel. Because there is not the same need to educate customers about its use, B20 can be effectively sold on price. By displacing a portion of existing wholesale B99 sales with retail margin sales of B20, Yokayo Biofuels can create a wider profit margin selling B20 at a price competitive with diesel. It is also worth noting that B20, unlike B99, is not considered experimental by the State of California so it can be sold without extensive variance-related paperwork. We believe that sales of B20, both at retail pumps and through delivery, are where much of our future growth will occur.

Yokayo Biofuels anticipates operating our upgraded production facility at full capacity by July of 2013. This means that we will be introducing 324,000 more gallons of biodiesel fuel into our market by that time[16]. The majority will be sold in the form of B20 blends. Market barriers we are going to encounter include the sheer amount of sales growth (biodiesel being only one fifth of a B20 blend, 5x 324,000 = over 1.6M gallons of B20 to sell), and competition from petroleum jobbers. However, Yokayo Biofuels believes we have a market edge because we sell direct to end users, and the enzymatic process technology can utilize cheaper feedstocks like brown and trap grease, and produce a greater yield. Additionally, there are many forms of marketing that we have not utilized in the past because of their lack of applicability to B99 market. This is in large part due to the B99 product's relative difficulty of use, which can only appeal to a niche market. The B20 blend is a more "user friendly" product that is priced competitively with diesel fuel; therefore we can advertise using traditional methods like billboards and fuel pricing signs, thus drawing the public in a way we could not previously. We plan to start by introducing B20 at our retail pumps, which already have an existing

[14] "Energy Usage and Its Impact on Mendocino County", 6/07, *www.greentransitions.org/Papers/EWG2007_FReport_64pgs.pdf*

[15] See attached Letter "Skunk Train"

[16] See Sustainability Section

infrastructure that caters to our B99 customers. This will be followed by B20 direct delivery operations.

Due in part to California state incentives, expansion is anticipated for companies producing and marketing biodiesel. Yokayo Biofuels has market advantages over much of the producer competition, in the same way we do over distributors. By being able to produce fuel that meets the ASTM standard from feedstocks such as brown and trap grease with greater efficiency at a higher percentage of yields, Yokayo Biofuels will be taking advantage of every opportunity available to gain an edge. Additionally, there are few producers who sell directly to their end users. We are confident these advantages and others, such as our experience, our knowledge about biodiesel gained from servicing the B99 market, and our core restaurant feedstock supplier base, will keep us ahead of the competition.

While we have used marketing partners in our B99 market sales effort, most of our marketing strategy in the B20 market sector will be aimed directly at retail pump customers and high value fleet customers. By keeping the direct connection to end users rather than selling to "middlemen", we will be able to maximize the values attained from all of the revenue-generating improvements that this project enables.

Project Implementation

Identify your project objectives, and describe how the tasks in your Statement of Work will lead to project completion.

The objectives of the project include construction of new facilities in order to produce biofuel using the enzymatic process, purchase and installation of the enzymatic process technology, upgrading old buildings, expansion of office space, and improvement of facility grounds. The tasks include planning, design phases and construction of new facilities, as well as installation of vessels and equipment, and start-up of biofuel production. Each task is dependent on the completion of the predecessor for providing the needed infrastructure, with the exception of Task 1, which will be ongoing.

Project schedule, the sequence of tasks, and how tasks are related to or dependent on each other.

Task 1 – Agreement Management

Grant administration will be performed throughout the project, starting when the agreement is executed, and ending October 2013. Critical Project Review will take place as required by the Commission, including 1) a kickoff meeting in which an updated schedule of products, an updated list of match funds, and an updated list of permits will be presented and reviewed, 2) ongoing critical project review meetings based on written determinations of the CEC, and 3) a final meeting to review written documentation of meeting agreements, and the schedule for completing closeout activities. Throughout the project, monthly and quarterly progress reports will be prepared. A Final Report will contain data collected after the construction phase and the start-up phase are completed.

Task 2 – Detailed Design and Specifications

The proposed project is midway through the design process. The finished work includes a review of the Building and Fire Codes for H or "hazardous" occupancy, a preliminary site plan

showing the location of the new buildings in relation to the property line, and preliminary locations of the vessels and the offices.

We have been working with the Mendocino County Planning and Building Department and expect to submit an application for a building permit in mid-May 2012. Tasks to be completed in May 2012 include responding to comments on the plans from Mendocino County and the Ukiah Valley Fire District. We have developed a good working relationship with Mendocino County and the Fire District through meetings and effective communication.

After the building permit is issued, we will contract with a General Construction Contractor to complete the construction project. We anticipate that the start of construction will be early June 2012.

Task 3 - Construction Management

Construction management will be performed throughout the construction and installation phases of the project. Project documentation and coordination with contractors will facilitate the completion of the project. Construction management includes preparation of daily reports, weekly meetings and meeting notes, responses to requests for clarification and change orders, photo documentation, and approval of invoices.

Task 4 - Construction of New Facilities

The proposed facilities will be constructed during the Summer and Fall of 2012. It is estimated that the construction period will be three months long. Allowing for a start in early June, the new facilities should be completed by September 2012. This schedule assumes that materials and equipment are not delayed, and the pre-engineered components can be fabricated in a timely manner and on schedule.

The new 4,500 sq. ft. roofed structure and the 1,600 sq. ft. enclosed mixing and reaction building will be finished first. After the roofed structure and the enclosed reaction building are complete, the existing building will be retrofit with offices and the 1,500 sq. ft. truck loading dock cover will be installed.

Task 4 may not be complete before Task 5 is started.

Task 5 - Installation of Vessels and Equipment

After the new buildings are complete and utilities are installed, new vessels will be installed, and those currently in use will be relocated. This process will take up to two-weeks to complete. The Piedmont enzymatic process equipment will be installed during this phase of the project.

The construction of the offices and truck loading dock (part of Task 4) may still be under construction when Task 5 and Task 6 begin.

Task 6 - Start-up Process

Once the new buildings are completed, the utilities installed, the current vessels moved and the new vessels installed, the start-up of the process will begin. We anticipate that the initial start-up of the facilities will take place during the first week after Task 5 is complete.

Task 7 – Data Collection and Analysis

Data Collection will take place after the construction, installation of vessels, and process start-up. Six months of data will be collected and reported in the Final Report (part of Task 1).

Identify proposed feedstocks, competition for feedstocks, and feedstock procurement strategies

Currently, Yokayo Biofuels uses its own collected used restaurant fryer oil exclusively for its biodiesel feedstock. Purchasing grease from other collectors remains a viable backup plan that we take advantage of as needed. Our 1,024 restaurant facilities supply approximately 40,000 gallons per month of used fryer oil.

This is where the enzymatic processor helps us immensely. Our proposed new feedstock is a combination of brown grease (processed trap grease, purchased from rendering companies) and trap grease that we will collect ourselves. We will be able to use this new feedstock because of the capabilities of the enzymatic processor, which will easily convert feedstock to marketable biodiesel that can be blended to make B20 for the targeted growth market. While our plan is to start out by purchasing brown grease, we recently purchased a 4,000 gallon vacuum truck with patented "Juggler" separation technology. This system allows us to pump out the grease trap at a restaurant, typically about 1000 gallons of water and 150 gallons of brown grease, separate the two liquids and return a filtered water product to the empty grease trap. The trap will remain fully functional and our truck will not be carrying the excess waste water (which would require extra trips to EBMUD for disposal), only the grease which is very usable to us. As we grow this new branch of our grease collecting department we are creating our own supply of "free" brown grease (likely better than free, as the restaurants are accustomed to paying steep fees to have grease traps pumped).

Yokayo Biofuels collects used fryer oil from a significant share of the restaurant market base in the areas comprising the Hwy 101 corridor between Marin and Mendocino Counties, as well as the area immediately east, from Berkeley to Lake County. We currently collect from 1,024 restaurant facilities.

Competition from rendering companies for restaurant fryer oil is very high. There is growing competition from other biodiesel companies, but rendering companies remain by far our largest competition. By turning the oil into biodiesel, we have the highest value product that can be made from used fryer oil, which gives us a market advantage over rendering companies. By using the most efficient processes possible to make the biodiesel, we can remain ahead of the other biodiesel companies as well.

A key market disadvantage has been that we rely on a third party to service grease traps and interceptors. The enzymatic process, in conjunction with our recently purchased specialized Juggler truck, will allow us to fully service grease traps and interceptors, and ultimately turn that into an additional feedstock for our fuel. Because restaurants are accustomed to paying a high fee to have their grease traps pumped, we will have an additional market advantage because we do not depend on that income.

Having the ability to make fuel out of trap grease (and brown grease, a commodity which can be purchased) not only grows our business plan and enables us to fulfill expanded plant capacity, but it also provides us a hedge. If yellow grease prices are high, we will have the ability to sell our used fryer oil and purchase brown grease on the open market- it historically runs much cheaper than yellow grease. Then we can make lower-cost biodiesel with it.

This will be especially important if the IRS biodiesel incentive returns- something that historically drives yellow grease prices up. Depending on the cold-flow properties of the fuel made from brown grease, which may be worse than the fuel made from our used fryer oil, hedging our bets this way with brown grease may end up being a seasonal option (more with

B99 than B20), but it is worth noting that the warm season is generally the season of highest yellow grease value.

Describe how this project with lead to or support your commercialization plans.

As a Stage 3 applicant, Yokayo Biofuels already has achieved commercialization with our biodiesel product in general. This project will help us achieve commercialization of a B20 biodiesel blend product, which takes advantage of lower cost brown grease feedstock. The improved storage stability from the complete elimination of soap will also help us retain existing B99 customers, thus aiding that product's continued commercialization. This project will also enable full commercial utilization of our new Juggler truck, which is specially designed to be able to efficiently pump grease traps. Additionally, this project should help Piedmont Biofuels commercialize their enzymatic process, and FAeSTER skid units, which could have an enormous effect on the industry as a whole, many of whose participants are facing the same production inefficiencies as Yokayo Biofuels. And this project will pave the way for commercialization of a Yokayo Biofuels glycerin co-product.

Project Readiness

Identify all contractual relationships, including feedstocks, needed.

Yokayo Biofuels has retained written contractual commitments with 70% of the 1,024 facilities from which we collect used fryer oil. The terms of these contracts are varied and proprietary. These contracts are made in a manner that keeps the pricing we offer the facility flexible enough to protect both them and ourselves, in the event of dramatically shifting market grease values. We expect to add trap grease services to many of these contracts during the duration of this project. We are also enrolled in SFPUC's grease purchaser program, to facilitate bidding on their grease in times when we are running low (see attached letter).

Where finished biodiesel product is concerned, Yokayo Biofuels serves both wholesale and retail customers. We have wholesale contractual commitments from Biofuel Oasis, a biodiesel station located in Berkeley, CA. The terms of the contracts are proprietary, but a letter of support from Biofuel Oasis is included that references their purchase commitment. Additionally, Yokayo Biofuels has commitments from Santa Rosa Community Market (see attached letter), the Solar Living Institute in Hopland, and the Biofuel Station in Laytonville. While many customers fill up at the fuel stations at these locations, a large number of Yokayo Biofuels customers are direct delivery end users. While they have signed a customer agreement that helps us comply with CDFA DMS biodiesel variance requirements, these customers are of a more decentralized variety typical of consumer goods and services, meaning their commitment is not of the written, contractual variety. There is a notable exception with the Skunk Train (see attached letter), who has a contract with us to supply them with B20. We plan on executing more contracts with large B20 customers in the future.

Contracts that are specific and critical to project completion have been retained with the following firms: Eichleay Engineers of California, and Rau and Associates (see attached letters). Additionally, we have a letter of intent from Piedmont Biofuels to provide us with their technology (see attached).

Provide documentation that the applicant owns, has access to, or controls site[17]

Finally, see attached letter from Lela Wadsworth, owner of the property on which the production plant sits, indicating her support of Yokayo's plans, and acknowledgment that we have access to and control the site.

Project Budget/Cost Effectiveness

The budget is divided by tasks, and by schedule. Work to be performed by Yokayo Biofuels staff is divided into work that is scheduled before and after construction takes place. The budget for work performed by Yokayo staff and consultants in Tasks 1, 2, 3, 5, 6 and 7 is based on an estimate of time and materials needed to perform the work.

The construction of new facilities (Task 4) to be performed by a contractor (subconsultant) is a discrete budget item. The construction budget is based on preliminary November 11, 2012, cost estimates for structures and a February estimate for site civil engineering and construction of bioswales.

Task	**Cost**
1. Agreement Management	$ 101,926
2. Detailed Design and Specifications	$ 21,960
3. Construction Management	$ 216,295
4. Construction of New Facilities	$ 3,866,030
5. Installation of Vessels and Equipment	$ 112,128
6. Start-up Process	$ 26,496
7. Data Collection and Analysis	$ 425,270
Total	**$ 4,770,105**

State funds are needed to supplement the SBA funds for the project. Costs for construction of facilities are high due to safety and building code requirements.

Cash Flow during Project[18]: Operations at Yokayo Biofuels are cash flow positive on a monthly basis. This is proven and supported by the corporate tax returns and the annual financial statements. **A sample cash flow budget of one month and one year are attached**. Collection of feedstock, production of fuel, and sales of completed product are very consistent and predictable.

Cash flow of project costs will be determined by the funding of the grant and the matching funds. The projected costs include a 20% overage contingency. Our in house project manager has significant experience in large construction projects and will be monitoring the costs of each component as construction progresses.

The budget is divided by task. The greatest budgetary cost estimate is for the construction of new facilities, which is also the task that will take the longest to complete. The construction management (Task 3)[19] is estimated to be 5% of the construction cost, well within

[17] See attached Letter "Lela Wadsworth"

[18] See attachment 1) Cash Flow Budgets One Month and One Year

[19] See chart above derived form Scope of Work

the typical range of costs for construction management of a project this size. Other Task budgets are estimated based on the length of time that the task will take to complete.

The goals of the project are as follows:
Quantative Goals:

- Higher production yield from existing feedstock
- Elimination of wash water in the process
- Sellable glycerin co-product
- Expansion of plant capacity; job creation
- Conservation of resources and energy
- Elimination of stormwater runoff and absorption of materials into ground

Qualitative Goals:

- Safer, cleaner, better designed place to work
- Higher quality biodiesel product

Completing this project will achieve all of the above goals and allow us to go beyond them in the future, to even greater capacity and greater sustainability.

The enzyme process results in 13.8% higher production yields, from the same volume of feedstock. This means that instead of producing 410,000 gallons of biodiesel last year, we would have produced 466,658 with this process- nearly 5,000 extra gallons per month, without introducing any new feedstock! With an average estimated gross margin of $3.65 per gallon (after feedstock and process chemicals), that totals over $200,000 for the year, or over $17,000 per month.

Eliminating the water washing (not required in the enzyme process) gets rid of 3.7 cents per gallon in chemicals and disposal costs and 8.5 cents in labor. That totals $50,000 per year, or $4,165 per month.

We have always had to dispose of our glycerin by-product because it has too many contaminants in it for any use. The enzyme process yields clean marketable glycerin, that we can sell at a price equivalent to an additional 18 cents per gallon of biodiesel produced. That totals $74,000 per year, or $6,165 per month.

The enzyme processor we are acquiring will increase our daily production from 1250 gallons to 2000. That's an additional 22,500 gallons per month. We cannot grow our grease collection department fast enough to quickly provide us with all that extra feedstock. And yellow grease costs over $2.50 per gallon, leaving too little margin. But the enzyme processor can utilize brown grease, with high free fatty acid content and lower market cost. We can acquire all the brown grease needed for a projected price of less than $1.50 per gallon. At the same time we are developing our own brown grease collection process, with a unique "Juggler" truck we acquired. We will begin to collect the trap grease from all our restaurants, ultimately yielding about 150,000 gallons per year in free feedstock (the restaurants currently pay a great deal to have the trap grease removed- our ability to do that for free or at low cost presents a market advantage). It will take 6-8 months to develop the feedstock acquisition, production increase, and resulting sales of the extra product. But at maturity, that will add almost 300,000 gallons per year in production and sales. This increase has a lower margin because of the brown grease cost (until we are collecting our own) so the gross profit will be lowered to $2.90 per gallon. At full capacity that will add $870,000 per year in gross profit, or $72,500 per month..

Yokayo Biofuels has been operating at a profit with positive cash flow for 2 years now. The above increases in gross profit will mostly drop to the bottom line. All the items above total $97,800 per month. This will easily provide for the required debt service on the matching funds and various additions to personnel and operating expenses due to the expanded production, sales, and delivery of product.

Yokayo Biofuels lists the following five positions at form B-6, part of Attachment F:

	Direct Labor Rate	Fringe Benefits %	Indirect Overhead %	General & Admin %	Loaded Hourly Rate
CEO	$20.35	5%	26%	35%	$33.78
CFO	$23.26	5%	26%	35%	$38.61
Civil Engineer	$30.77	5%	26%	35%	$51.08
Process Engineer	$24.95	5%	26%	35%	$41.42
Plant worker	$47.00	5%	26%	35%	$78.02

The Direct Labor Rates are the hourly rates paid to each position. The Fringe Benefits at Yokayo Biofuels consist of the group Health Plan. The Indirect Overhead rate is based on indirect overhead costs divided by direct labor costs. The General and Administrative rate is based on general and administrative costs divided by direct labor plus indirect overhead costs. The Loaded Hourly Rate is a total of the Direct Labor Rate and the values generated by each of the three additional rates.

The Direct Labor Rate and Loaded Hourly Rate are higher for Plant Worker because that position is covered by Prevailing Wage requirements, as opposed to officers and engineers.

Yokayo Biofuels' average of loaded rates takes into account the number of hours projected for each position, above. As reported at Attachment F:

Average Loaded Hourly Rates:

	Loaded Hourly Rate	Projected Number of Hours	Loaded Project Earnings
CEO	$33.78	684	$23,105.52
CFO	$38.61	306	$11,814.66
Civil Engineer	$51.08	1,506	$76,926.48
Process Engineer	$41.42	1,738	$71,987.96
Plant worker	$78.02	480	$37,449.60
	Total	**4,714 hours**	**$221,284.22**

Dividing the total of $ 221,284.22 by 4,714 hours gives an average loaded rate (ALR) for the project of $ 46.94/hr.

Match Funding

Our project cost is $ 4,770,105. This is based on the following:

$ 101,926	Task 1: Agreement Management
$ 21,960	2: Detailed Design and Specifications
$ 216,295	3: Construction Management
$ 3,866,030	4: Construction of New Facilities
$ 112,128	5: Installation of Vessels and Equipment
$ 26,496	6: Start-up Process
$ 425,270	7: Data Collection and Analysis
$ 4,770,105	**Total**

The breakdown of how we will fund the project is as follows:

$ 2,570,000	SBA loan from Savings Bank of Mendocino County	53.9% of total funding
$ 339,775	Yokayo Biofuels "in-kind" contribution, comprised of labor and brown grease value	7.1%
$ 1,860,330	CEC PON-11-601 Grant Contribution	39%
$4,770,105	**Total**	**100%**

See attached letter of intent from Savings Bank of Mendocino County, and attached spreadsheet detailing Yokayo Biofuels "in-kind" contribution.

Economic Benefits

Immediate jobs created as a direct result of the project are as follows:

Level	Industry Class	Job Duration	Number of Jobs
Journeymen	Construction Workers	Temporary 3 months	9.4-10
Total Temp. Jobs			9.4-10

At full capacity, expected within 18 months of project completion, we expect the following new jobs to be created, with no jobs being eliminated:

Level	Industry Class	Job Duration	Number of Jobs
Management		Permanent full time	1
Administrative		Permanent full time	2
Sales		Permanent full time	2
Drivers		Permanent full time	3
Total Pjct. Jobs			8

Quantify State and Local Tax Impact:

Of the $4,770,105 project cost, approximately $3.5 million will be paid to local and California contractors and suppliers. Assuming half of that ends up as taxable California wages, there will be $1.5 million subject to personal income tax. Using an average tax rate of 4%, $60,000 of California personal income tax would result from the project.

Regarding tax impact upon commercial scale, Yokayo Biofuels has been operating at commercial scale since 2006. Typical payments to the state of California for sales and fuel taxes are approximately $12,000 per month. With expanded production and sales, this will grow to approximately $23,000. Sales tax paid on construction materials is estimated to exceed $38,000.

Adding 8 new positions at capacity will result in extra income taxes paid by staff to the state. However, the average annual wages of our plant workers is about $35.000. This level of income will likely not result in significant California incomes taxes. If a worker files "single" they may owe $500. If they are married with children, and not much other income, they will owe no tax. Let's assume half of each, so eight position might result in $2,000 of extra annual income tax.

Income taxes paid by the company are reported by the individual shareholders, since Yokayo is an S-corp. The 2012 corporate taxes have not yet been completed, but taxable income is expected to be approximately $150,000. If the average shareholder is paying a tax rate of 6%, this results in $9,000 of California state income tax. Sales growth will have a significant change on the taxable income of Yokayo Biofuels, as we are past break even and most income increases will sink to the bottom line. Taxable income for the 2014 year, the expected year for reaching capacity, could easily be $500,000. At a tax rate of 6% that would result in $30,000 of California state income tax.

To summarize: Annual taxes from the project will be a one time event estimated at $60,000. After reaching plant capacity, combined taxes to California will go from $21,000 to $55,000 per year, an increase of $34,000 annually.

Impact to Suppliers:

The full project cost is approximately $4,770,105. Approximately $3.5 million of that are construction costs, which will all be paid to local California contractors and suppliers. After completion of the project, there will be no further expenditures of this kind. Ordinary operating costs and expenses will rise as we increase production and sales over the next 12-18 months. The variable costs, directly associated with fuel production should increase about 90% along with volume. Those costs are paid to California suppliers and local businesses. Presently such costs average about $36,000 per month. A 90% increase would raise them to $68,400., for an increase of $32,400 per year. Yokayo Biofuels has no contractual supply-side product distributors at this time

Impact from Co-products:

Prior to the project Yokayo Biofuels had no co-products. We dispose of two waste streams at a local composting facility, but the percentage of their product that comes from Yokayo is minimal. Therefore the impact on their revenues from selling the compost would be difficult to estimate.

With the completion of this project we will have marketable glycerin as a co-product and will be selling it either to local California businesses or to nationwide glycerin brokers. It is difficult to estimate the revenues such buyers might achieve after purchasing our glycerin. If we

sell them 6,000 gallons per month at $1 per gallon, they could possibly use it as a base to produce liquid soap and sell the soap for $10 per gallon, thereby grossing $60,000 per month. Whether this is possible or likely is beyond the scope of this grant application. We will have no other co-products.

Economically Distressed Areas Information:

According to the California Employment Development Department Labor Market Information Division, the unemployment rate in Mendocino County in December of 2011 was 10.2%.This was about 1 percentage point above the national average, which just barely constitutes an economically distressed county, as defined by the federal stimulus act passed by Congress in February 2009.

Most of the jobs in the Ukiah area are in agriculture industry. The average reported wage rate for Mendocino County for 2011 was $13.90 per hour, according to City Data.com internet site. Yokayo Biofuels offers well paying jobs that are mostly above the average wage rate for Mendocino County. Our 17 employees have an average hourly rate of $17.47, with only one of them below the county average, and that position is part time. New positions that open up after the completion of the project will continue to be paid accordingly.

o Percentage of population falling under the poverty level 19.6% in 2009 (http://www.city-data.com/poverty/poverty-Ukiah-California.html)
o Local Unemployment Rate – 12.5% in March, 2011 (http://www.city-data.com/city/Ukiah-California.html)

Sustainability

This project addresses the Sustainability Goals in Section 3101.5 of Title 20 California Code of Regulations as follows:

GHG Reduction

The biodiesel Yokayo Biofuels produces from recycled used fryer oil already demonstrates among the highest potential for substantial reduction of greenhouse gas emissions, as demonstrated by its LCFS-designated carbon intensity of 11.76gCO2/MJ[20]. This project will significantly reduce that carbon intensity.

The lower temperature from using the enzymes will result in 62.5% less heat used[21], which lowers the total carbon intensity 25% to 8.82gCO2/MJ. It is the belief of Yokayo Biofuels that numbers better than 8.82gCO2/MJ cannot be easily achieved commercially at this time, making the biodiesel we will produce from this project among the very lowest in GHG emissions when compared with the petroleum baseline.

Conventional biodiesel production processes already protect the environment by not relying on resource extraction or any of the dirty processes associated with petroleum refining. Yokayo Biofuels takes that further by using our biodiesel in all of our trucks (and most of our employee vehicles), as well as the boiler at our production plant, and by not relying on virgin agricultural feedstocks, eliminating the carbon footprint associated with pesticide application and other practices associated with growing feedstocks exclusively for biodiesel production. By switching to a dramatically more energy and resource-efficient process, and also adding a lower

[20] As calculated through the ARB Biorefinery Registration process.
[21] Based on Process Engineer's assessment that 40% of our footprint comes from heating oil.

carbon waste stream (brown grease and trap grease), we will be further improving our ability to preserve ecosystem integrity, and protect and enhance the resiliency of natural ecosystems.

Conservation of resources has to be a high priority with every industry as we live in a world with more and more people and less and less natural resources. Our new plant will eliminate our water washing, which uses 18,000 gallons of water per month. That water has to be taken to the EBMUD disposal area, 2.5 hours away. Although our trucks burn B99, it is still using up fuel. Those trips will stop and we will not be disposing of that dirty water anymore. Also, because the enzyme process can work with cooler and wetter feedstock, we won't have to use as much energy to heat and dry the oil prior to conversion. In addition, our physical plant does not have sufficient offices for our administrative staff, so we have always had a second location for those personnel. This has required much travel back and forth. The new plant will have all the offices on site, eliminating that back and forth travel and saving fuel.

By creating infrastructure that eliminates wastewater output and stormwater runoff, we are implementing appropriate resource protection practices.

By using biodiesel in our vehicles and boiler, we are using renewable energy in the feedstock collection, production, processing, and distribution phases. We plan to add to this in the future with photovoltaic electrical power, but that is only part of this project in the sense that the larger new building in the facility yard has been designed to maximize its solar panel potential.

Petroleum Reduction

As established in the technical narrative earlier in this grant proposal, we are moving to a process that uses less methanol per gallon but yields more fuel per day. On average we use 266 gallons of methanol a day and with the new process we will use 260 gallons of methanol per day. Meanwhile, we will be producing almost 900 gallons more fuel per day due to yield increase and capacity increase. This amounts to 324,000 gallons of petroleum based diesel that we will offset annually, in addition to what we've already been displacing, which amounts to roughly 417,000 gallons annually.

Now for some scientific perspective on what we've achieved. On average, each gallon of petroleum diesel fuel contains about 226 moles of carbon. Each mole of carbon weighs roughly 12 grams. So each gallon of diesel fuel has 226 moles X 12 grams/mole = 2712 grams of carbon. CO2 is formed in the combustion process, when each carbon atom joins forces with two oxygen atoms. A mole of oxygen weighs around 16 grams. So a mole of these CO2 atoms weighs 12+16+16 grams = 44 grams. So then, if each gallon of fuel has 226 moles of carbon that are burned and converted into CO2, you wind up with 226 x 44 grams/mole = 9944 grams (21.91 lbs) of CO2 produced per gallon of fuel.[22]

If one uses the estimate that each gallon of used fryer oil biodiesel displaces 87% of the CO2 from a gallon of petroleum diesel,[23] then roughly 19 lbs. of CO2 are displaced by every gallon of biodiesel that Yokayo Biofuels has used and sold. At an average of 300,000 gallons for the past ten years, that is almost 60 million total lbs. of CO2 that we have displaced!

By reducing our carbon intensity by 33% and increasing our yearly output to 703,000 gallons, we will displace almost 14 million lbs. of CO2/year as a result of this project.

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[22] Analysis originally provided at http://biodieselisgood.com/, a now-defunct blog, by Galen Bowen, Springboard Biodiesel.

[23] Our carbon intensity of 11.76 gCO2/MJ, as established through CARB, is an 87% reduction from 93.08 gCO2-eq/MJ which is given as the carbon intensity of petroleum diesel at http://www.engr.colostate.edu/~thb/Publications/BatanQuinnWillsonBradley_AlgaeLCA.pdf

If this technology were to be utilized to its full potential, thus turning all brown grease in the nation into biodiesel, hundreds of millions of gallons of new, very low carbon biodiesel would be enabled (estimates vary on the exact amount of brown grease created annually). This would result in the offsetting of tens of billions of lbs. of CO2/year, which is a tremendous achievement!

Natural Resource Impact

Land use

By not using any virgin agricultural feedstocks, Yokayo Biofuels is already minimizing direct and indirect land use impacts on California's agricultural economy. However, we will take strides to go even further with this project plan, by re-using brown grease and trap grease as our feedstock. In the words of Piedmont Biofuels, "In the current implementation of the second version of the Renewable Fuel Standard (RFS-2), land use concerns were raised in the eligibility of feedstocks for the advanced biofuel category. If land use issues become integrated into environmental policies of nations across the globe, the use of food grade material for biofuels may decrease."[24] In such a scenario, prioritizing the use of low carbon waste streams, as we are doing, is the path to success.

Air Quality

Yokayo Biofuels is in compliance with AB 118 Air Quality Guidelines, and is at the cutting edge of improving air quality by being one of the lowest carbon intensity biorefineries listed at the LCFS database[25]. The implementation of the new technology proposed in this project reduces toxic emissions by elimination the use of KOH flakes and improving our methanol vapor collection system. This project further reduces criteria emissions by greatly increasing yield and overall production, in turn increasing the amount of biodiesel available to the public. Biodiesel usage improves air quality over petroleum diesel usage, as shown in the following charts:

Figure 1. Tailpipe Emission Changes with Biodiesel[26]

Tailpipe Emission Changes with Biodiesel

Carbon Monoxide	-43.2%
Hydrocarbons	-56.3%
Particulates	-55.4%
Nitrogen oxides	+5.8%
Air toxics	-60% to –90%
Mutagenicity	-80% to –90%
Carbon dioxide***	-78.3%

****life cycle emissions*

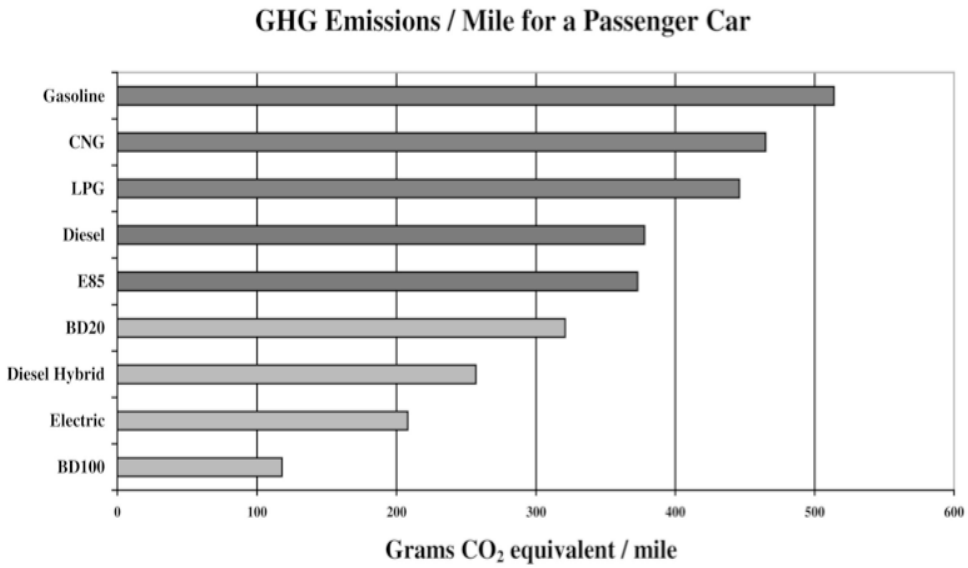
[24] "Enzymatic Catalysis for Biodiesel Production", Piedmont Biofuels, 12/30/10

[25] As measured by LCFS Yokayo Biofuels' 11.76gCO2/MJ ranks among the very lowest http://www.arb.ca.gov/fuels/lcfs/reportingtool/Biofuel_Registration_Info_complete_01042012.pdf.

[26] from the National Renewable Energy Laboratory's Biodiesel Handling and Use Guidelines, available online at http://www.nrel.gov/vehiclesandfuels/npbf/feature_guidelines.html

Figure 2. GHG Emissions / Mile, Grams CO2 equivalent / mile[27]

Fuel	Greenhouse Gases	Particulates	Nitrous Oxides	Volatile Organic Compounds	Carbon Monoxide
Gasoline	+35	-70	-55	+170	+415
CNG	+20	-80	-45	-30	+190
LPG	+20	-80	-60	0	+210
Ethanol 85%	0	-75	-55	+130	+210
Diesel	0	0	0	0	0
Biodiesel 20%	-15	-20	0	-10	-15
Hybrid	-30	-20	-20	-20	-20
Electric	-45	-80	-95	-100	-100
Biodiesel 100%	-70	-55	+5	-55	-45



Waste water

Currently we are using a biodiesel reaction process that results in the production of 250 gallons of waste wash water per day. Since the water is mixed with contaminates such as soap, oil, and dilute chemicals it is trucked 2.5 miles away to EBMUD disposal. The proposed enzymatic biodiesel reaction process that this project would implement completely eliminates the need to water wash fuel. The water involved in the reaction is 100% recycled, or converted to vapor. As a result our waste water use will be reduced from 250 gallons per day to 0, or 100%.

The second water saving measure proposed involves the repaving of existing surfaces. Resurfacing hardtop is necessary to eliminate absorption of water into the ground, and will redirect stormwater addressing that issue. In addition, bioswales will be added to facilitate rainwater capture for use in incidental and landscaping water needs thus utilizing a valuable resource.

Energy consumption reduction

The production facility currently meets the demand of process energy by generating heat by using an in house boiler fueled by the biodiesel we produce. We plan to continue using this efficient system in the next phase of expansion as proposed by this project.

[27] from "Report on Bus Alternatives", authored by the Alternative Fuel Vehicle Program, Sponsored by HGCI, UOS, Ford Motor Company, and Harvard University, 7/31/01

Several parts of this proposed project create opportunities for Yokayo Biofuels to become more energy efficient. The building designs gives us planned opportunities such as new surfaces for the installation of solar panels that will eventually equal or exceed our electrical

Feedstock Sourcing

Type, Source and Volume of Feedstock/Waste Streams for Project

Currently Yokayo Biofuels uses collected used restaurant fryer oil exclusively for its biodiesel feedstock. Purchasing grease from other collectors[28] remains a viable backup plan that we take advantage of as needed. We have a local, committed feedstock supplier base of 1,024 restaurant facilities that supply approximately 40,000 gallons per month of used fryer oil.

This project will implement a new technology that will enable Yokayo Biofuels to supplement our current, reliable feedstock supply with purchased brown grease, and ultimately trap grease that we will collect ourselves. Not only will an increase in the amount of feedstock increase yield, but the new process itself will increase the yield of biodiesel from the existing amount of oil. As a comparison; the current feedstock quantity of approximately 480,000 gallons per year generates approximately 417,000 gallons of finished biodiesel. The feedstock will be increased to 710,000 (355 day per year, to account for holidays and down time) gallons, and will generate approximately 703,000 gallons of finished biodiesel. This represents a feedstock increase of 48%, with a finished biodiesel increase of 68%.

There is an additional benefit to using the enzymatic technology as compared to the current process. The current process produces approximately 250 gallons of soapy, oily washwater, and 350 gallons of crude glycerin (contaminated with biodiesel, FFAs, alcohol, soap, water and salts) per day, both of which require costly disposal outlets. The new process will eliminate the washwater waste stream, and eliminate contaminates in the glycerin co-product, thereby making it a valuable commodity.

Sustainablity Certification

Please see attached letter

This project will promote sustainable production of alternative, renewable fuels, technologies through use of certified sustainable feedstocks or in accordance with (RSB in our case). Reference 3101.5(b)(3)(A)

CEQA

CEQA documentation was submitted to the state of CA clearing house on 2/21/12.
See attached application for NOE, also Mendocino County Debt. Planning and Building Services letter under the designation “Not a Project”.

Local Health Impacts

See attachment G

Scope of Work

See attachment D

Project Team See Following Pages, 27-28